

Table 2

Radular character	<i>Tegula gallina</i>	<i>Tegula funebris</i>	<i>Tegula eiseni</i>	<i>Tegula mariana</i>	<i>Tegula regina</i>	<i>Tegula rugosa</i>	<i>Tegula aureotincta</i>	<i>Tegula brunnea</i>	<i>Tegula pulligo</i>	<i>Tegula montereyi</i>
Central tooth	45.6	54.3	55.5	55.5	64.5	59	69.5	58.5	64	60
length %	(42-52)	(47-63.5)	(50-58)	(55-56)	(63-66)	(55-64)	(66.6-73.4)	(56.5-61)	(54-73)	(55-77)
width range	10	16.5	8	1	3	9	6.8	4.5	19	22
Lateral teeth	pointed massive	pointed	obtuse	obtuse	obtuse	obtuse	pointed	pointed	pointed	pointed
Marginal teeth										
point of conversion of tip from pointed to round	6-8	5-7	all round	all round	all round	4-7	5-7	3-6	1-4	5-7
Marginal teeth	1	middle of 1	base of 3-4	base of 5	base of 1	base of 11-12	middle of 1	middle of 1	middle of 1	variable usually
serrations begin	fade until 6-9	fade until 6	fade until 8-9		fade until 14-18				or below	base of 1
Marginal teeth serrations complete	10-11	8-10	12-13	8-10	21-25	13-14	7-8	8-10	7-8	15

Observations on the Growth of *Cypraea spadicea*

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A RECENT NOTE in the literature by BENTON (1964) prompted a report at this time on some observations which have been made on the local cowrie found along the shores of Los Angeles County.

Several juvenile specimens were collected at low tide on May 16, 1964. In the area at that time were over 200 adult animals as well, hidden in cavities in the rock above the water line and covered with eel grass. During this same period, underwater observations (Dr. R. C. Fay, personal communication) indicated large numbers of the juveniles in deeper water. A specimen was placed in a newly established four-gallon all-glass tank, outfitted with efficient aeration and under-the-sand filtration, and several

rock formations were placed in the tank to provide refuge. Other inhabitants in the tank consisted of two adult *Cypraea spadicea* SWAINSON, 1823 (33 mm and 55 mm in length and collected along with the juveniles), three cling-fish, *Sicyogaster meandrica*, a sea horse (identification unknown, approximately 90 mm from the base of the tail to the top of the head), eight to ten *Conus californicus* HINDS, 1844 (20 mm long), numerous small limpets and other forms brought in on the rocks.

The subject when first caught was 30 mm in length with no trace of adult coloration, but had the usual banded shell and spire. Its mantle was a smoky orange-brown with black polka-dots. Although the young *Cypraea spa-*

dicea was very active, consuming an approximately one gram slice of frozen shrimp every other day, obvious growth did not begin until after two weeks. The adult *C. spadicea* did not eat at first but remained fixed near the surface of the tank in the air stream. They soon became as voracious as the young one, responding immediately to food placed in the tank and resting mostly in the lower portion of the tank among the rocks.

At the end of five weeks the shell of the juvenile was now 40 mm and a chocolate coloring was beginning about 4 mm from the edge; it was about 10 mm wide. The edge was quite thin and came to a sharp edge. During the growing period the mantle was observed to be drawn over the shell at all times and was not withdrawn, when the animal was handled gently. The sixth week the shell was 43 mm long and the color was darker. The turn over was complete and the labial edge was pointed towards the columellar edge; it was very thin, sharp, white, and transparent. No teeth were present on the labial edge, but very small smooth ripple-like teeth were noted on the columellar edge. A measurement of the girth indicated that an increase in growth of 42 mm occurred since the animal had been caught.

At the end of the seventh week the transparent labial edge was now opaque and white, and small teeth were visible along the edge which had become much thicker. The teeth on the columellar edge were large, being almost those of an adult. These teeth were deposited just about on the line where growth started after the animal had been collected. Some of the original banding was visible inside the shell but most of the dorsal side was a deep brown color. The length was now 44 mm. By the end of the eighth week the shell had thickened and all of the teeth were present on both edges. The final count of teeth was: labial - 23; columellar - 21 (as compared with the adult specimens in the tank, which had for the 55 mm shell: labial - 26, columellar - 22; and labial - 20, columellar - 19 for the 33 mm shell). At this date (March 1965) the animal is still active, with normal coloration and has stabilized at a length of 45 mm. None of the adult specimens was observed to grow during this period. The

temperature range noted during the growth period was 74° to 76° F.

Although the colony of adult *Cypraea spadicea* in the field remained active and large throughout May and June, no other juveniles were collected. During August most of the adult population disappeared, presumably to deeper waters. In November some of the colony returned and another juvenile was collected. This one was in the process of turning and was already brown in color. An adult was also collected and the two animals were placed in a thirty gallon tank similar to the smaller one, except made of plywood covered with fiberglass. It also contained a small (40 mm) fish. The fish continually pecked at the cowrie mantles causing them to be withdrawn. The juvenile soon weakened and although it was transferred to the smaller tank, it succumbed. The adult remained in the large tank but the shell soon showed signs of deterioration, presumably because the mantle was kept withdrawn. The animal was transferred to the smaller tank whereupon the mantle was again extended and eating actively resumed. The shell shows some signs of rejuvenation.

SUMMARY

It appears that once the *Cypraea spadicea* reaches adulthood growth is very slow, if it continues at all, and may be confined to merely maintenance of the shell at its present size. These observations of growth correspond well to the classifications proposed by SCHILDER (1938).

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